

# Astronauts begin training for station assembly

*Leestma: ‘It is important for us to begin work now to train the EVA crews who will support space station assembly flights.’*

By Eileen Hawley

A cadre of 14 space shuttle astronauts has begun intensive training in preparation for the space walks required for on-orbit construction of the International Space Station.

Beginning in July 1998 on STS-88 and continuing through August 1999 on STS-100, astronauts will begin on-orbit construction of the space station over the course of 18 planned space walks.

Jerry Ross and James Newman were previously assigned space walking duties as members of the STS-88 crew in August 1996. Training will now expand to include Leroy Chiao, Robert Curbeam, Mike Gernhardt, Canadian Astronaut Chris Hadfield, Tom Jones, Mark Lee, Michael Lopez-Alegria, Bill McArthur, Carlos Noriega, James Reilly, Joe Tanner and Jeff Wisoff.

“It is important for us to begin work now to train the EVA crews who will support space station assembly flights,” said Dave Leestma, director of Flight Crew Operations. “These crew members will be exceptionally busy preparing for some challenging and demanding tasks, from initial assembly tasks through installation of the robotic arm and an airlock for station-based EVAs. We expect that these assignments may be refined in the future, with additional assignments as mission requirements dictate.”

American assembly flights for the International Space Station will begin with STS-88/ISS-2A, scheduled for a July 1998 launch. That mission will be highlighted by two space walks, and the mating of the U.S.-built Node 1 station element to the Functional Cargo Block, which already will be in orbit. During their space walks, Ross and Newman will connect power and data transmission cables between the Node and the Functional Cargo Block. The Functional Cargo Block, which was built for the U.S. by the Russian Space Agency, is scheduled for launch on a Russian Proton rocket from the Baikonur Cosmodrome in Kazakstan in June 1998.

Node 1 will be the first station hardware delivered by the space shuttle. It has two

Pressurized Mating Adapters, one attached to either end. One Pressurized Mating Adapter is permanently mated to the Functional Cargo Block and the other used for orbiter dockings and crew access to the station.

In January 1999, Chiao, Wisoff, McArthur and Lopez-Alegria will conduct four space walks during the course of the STS-92/ISS-3A mission. Building on previous American and Russian assembly flights, STS-92 will carry the first of several integrated truss structures for the International Space Station. Integrated Truss Structure Z1 will be attached to Node 1 and will allow the temporary installation of the first U.S. solar arrays, called the P6 Photovoltaic module. The Z1 truss will serve as the mounting location for following truss sections and the central point for electrical power to be distributed throughout the station.

In addition to the Z1 truss, STS-92 will deliver a third Pressurized Mating Adapter that will be attached to Node 1 to provide an additional station shuttle docking port; install a Ku-band communications system on the station; and deliver control moment gyroscopes that will provide attitude control for the station following assembly flight 5A in May 1999.

In January 1999 Commander Bill Shepherd, Soyuz Commander Yuri Gidzenko and Flight Engineer Sergei Krikalev will lift off in a Soyuz rocket to begin permanent occupancy of the station.

Two months later, Joe Tanner and Carlos Noriega, along with their STS-97/ISS-4A crew mates, will arrive to conduct two space walks to install a set of solar arrays and associated equipment including two thermal control system radiators. Tanner and Noriega will make power, data and utility connections between the photovoltaic module, radiators and station and they will assist with the deployment of the arrays and radiators. In May 1999, the U.S. Laboratory Module will arrive on STS-98/ISS-5A. During that mission, astronauts Mark Lee and Tom Jones will conduct three space walks, connecting the lab to the station’s cooling and power systems, assisting with the relocation of a pressurized mating adapter to allow for future

shuttle dockings and attaching space walking equipment and aids to the lab module’s exterior.

The U.S. Laboratory module will be outfitted in June 1999 with the arrival of Curbeam and Hadfield on STS-99. During three space walks, they will install a UHF antenna to provide space-to-space communications for U.S.-based space walks from the space station and they will install the Canadian-built Space Station Remote Manipulating System robotic arm needed to perform assembly operations on subsequent flights. With his scheduled space walks, Hadfield will become the first Canadian to conduct a space walk.

With STS-100 in August 1999, Gernhardt and Reilly will perform three scheduled space walks to install a joint airlock that provides station-based space walking capability supporting operations conducted in both American and Russian space suits. The first space walk will be done from the shuttle airlock to make utility connections for the station airlock. The next two space walks will be from the station airlock to install space walking aids and equipment on the exterior and nitrogen tanks.

Each of the astronauts named for these flights has previous space flight experience, with the exception of Curbeam who will make his first flight in July and Reilly who will make his first flight in January 1998. Ross, Newman, Chiao, Wisoff, Tanner, Lee and Gernhardt all have performed space walks during their previous flights. The remaining astronauts, Lopez-Alegria, McArthur, Noriega, Jones, Curbeam, Reilly and Hadfield are training for their first space walks.

“The assignment of these EVA crew members is a critical element in our ability to build a space station on the ground that can be successfully assembled on orbit,” said Randy Brinkley, space station program manager. “I am highly pleased with the level of expertise and dedication these crew members bring to the program.”

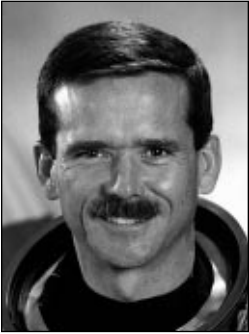
Updated information on the International Space Station and assembly sequence flights can be found at the space station home page at address: <http://station.nasa.gov> □



Ross



Chiao



Hadfield



Jones



Lee



McArthur



Tanner



Newman



Gernhardt



Lopez-Alegria



Curbeam



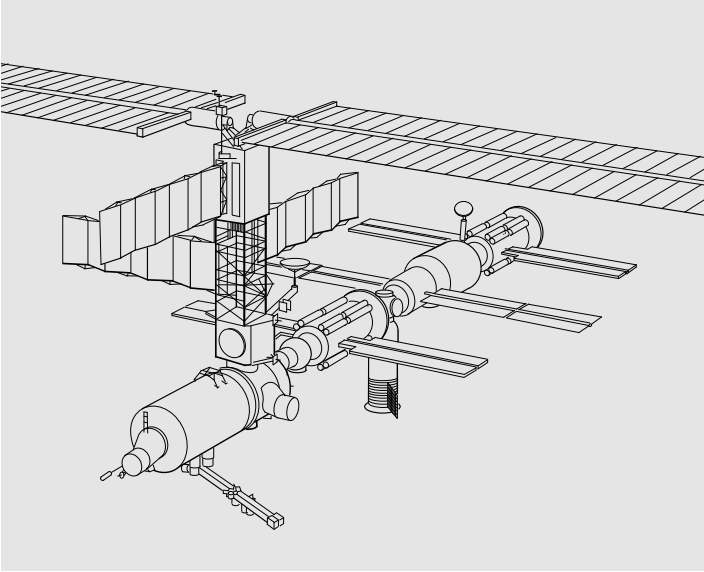
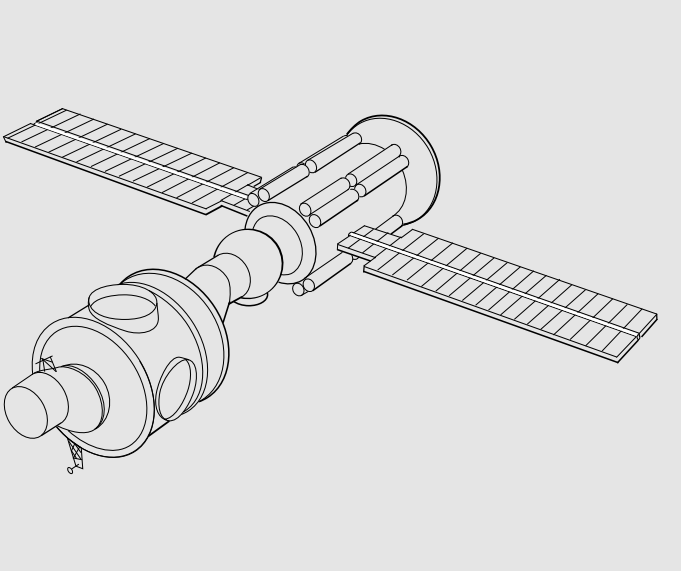
Reilly



Noriega



Wisoff



Left: American assembly flights for the International Space Station will begin with STS-88/ISS-2A, scheduled for a July 1998 launch. During their space walks, Jerry Ross and Jim Newman will connect power and data transmission cables between Node 1 and the Functional Energy Block. Right: The U.S. Laboratory module will be outfitted in June 1999 with the arrival of Curbeam and Hadfield. In three space walks, they will install a UHF antenna to provide space-to-space communications for U.S.-based space walks and install the Canadian-built Space Station Remote Manipulating System robotic arm.

## Astronaut space walk assignments for assembly of space station

Flight	Crew Members	Date	Payload
STS-88/ ISS-2A	Jerry Ross; Jim Newman	July 1998	3 space walks; Node 1; connect power cables
STS-92 / ISS-3A	Leroy Chiao; Jeff Wisoff; Michael Lopez-Alegria; and Bill McArthur	January 1999	4 space walks; Integrated Truss; Portable Mating Adapter
STS-97/ ISS-4A	Joe Tanner; Carlos Noriega	March 1999	2 space walks; Photovoltaic module
STS-98/ ISS-5A	Mark Lee; Tom Jones	May 1999	3 space walks; U.S. Lab Module
STS-99/ ISS-6A	Chris Hadfield; Robert Curbeam	June 1999	3 space walks; Lab out-fitting; Remote Manipulating System
STS-100/ ISS-7A	Mike Gernhardt; James Reilly	August 1999	3 space walks; Joint Airlock High Pressure Gas Assembly